America's WETLAND

Campaign to Save Coastal Louisiana

Report of the Coastal Louisiana Technical Summit

New Orleans, Louisiana
October 16-17 2003

Prepared by
Gerald E. Galloway, Jr. PhD, PE,
Titan Corporation

For the
American Society of Civil Engineers
Task Committee on America's WETLAND
James R. Hanchey, PE, Chair
Steven R. Abt, PhD, PE, Member
Gordon P. Boutwell, Jr., PhD, PE, Member
Charles C. Calhoun, Jr., PE, Member
Henry J. Hatch, PE, Member
Donald F. Hayes, PhD, PE, Member
Ehab A. Meselhe, PhD, PE, Member
Dominic Izzo, PE, Advisor
John E. Durrant, PE, Advisor

November 20, 2003

Report of the Coastal Louisiana Technical Summit

America's WETLAND

Campaign to Save Coastal Louisiana

New Orleans, Louisiana
October 16-17 2003

A. Background – The Louisiana Wetland Challenge

[Extracted from the Louisiana Comprehensive Coastwide Ecosystem Restoration Study – modified to update information]

Coastal Louisiana is one of the world's most significant wetland areas. It has lost over 900,000 acres since the 1930s. As recently as the 1970s, the loss rate for Louisiana's coastal wetlands was as high as 25,600 acres per year. The current rate of loss is about 16,000 acres per year. It is estimated that coastal Louisiana will experience a 320,000-acre net loss by the year 2050. The cumulative effect of human activities in the coastal area has been to drastically tilt the natural balance from the net land building deltaic processes to land loss due to altered hydrology, subsidence, and erosion. Approximately 30 percent of the land losses being experienced in coastal Louisiana are due to natural causes. The remaining 70 percent are attributable to human effect on the environment, both direct and indirect.

The Louisiana coastal plain remains the largest expanse of coastal wetlands in the contiguous United States. The coastal wetlands, built by the deltaic processes of the Mississippi River, contain an extraordinary diversity of estuarine habitats that range from narrow natural levee and beach ridges to expanses of forested swamps and fresh, brackish, and saline marshes. Taken as a whole, the unique interplay of habitats, with their hydrological connections to each other, upland areas, the Gulf of Mexico, and migratory routes of birds, fish, and other species, combine to place the coastal wetlands of Louisiana among the Nation's most productive and important natural assets. In human terms, these coastal wetlands have historically been a culturally diverse center for social development.

The coastal wetlands protect an internationally significant commercial-industrial complex from the destructive forces of storm-driven waves and tides. This complex includes deep-draft ports that handle the Nation's waterborne commerce and the most active segment of the Nation's Intracoastal Waterway and that have an annual commercial and natural security impact valued at more than $15 billion. ***America's WETLAND*** indicates "More than 25% of all oil and gas consumed in this nation comes across Louisiana's shore by tanker, barge or pipeline. It is from this area that distribution of energy for the entire eastern U.S. begins. As the protective wetlands and barrier islands disappear, oil and gas infrastructure along the coast becomes exposed to open Gulf conditions. Wells, pipelines, ports, roads and levees that are key to energy delivery become more vulnerable and the potential for damaging oil spills increases." (http://www.americaswetland.com) Louisiana's coast is at the end of the Central and Mississippi flyways, and nearly 70 percent of the waterfowl migrating along these flyways winter on the Louisiana coast. Coastal Louisiana also provides critical stopover habitat for neotropical migratory songbirds, as well as other avian species. Coastal Louisiana also provides critical nesting habitat for many species of water birds such as the brown pelican. These economic and habitat values, which depend on the biological productivity of Louisiana's coastal wetlands, merit national attention.

Louisiana's coastal wetlands were built up by Mississippi River floodwaters depositing enormous volumes of sediment and nutrients on the continental shelf at its mouth. These sediments were eroded from the lands of the vast Mississippi River basin in the interior of North America. For the last several thousand years, the dominance of the land building or deltaic processes resulted in a net increase of more than 4 million acres of coastal wetlands. In addition, there was the creation of an extensive skeleton of higher natural levee ridges along the past and present Mississippi River channels, distributaries, and bayous in the deltaic plain and beach ridges of the chenier deltaic plain. The landscape this produced gave rise to one of the most productive ecosystems on earth. Only the most intensively managed agricultural systems that are artificially subsidized by large inputs of energy and fertilizer could possibly rival the ability of these estuarine wetlands to convert sunlight and carbon dioxide into biomass.

Today, most of the Mississippi River's freshwater with its nutrients and sediments are channeled out to the deep waters of the Gulf of Mexico, bypassing the coastal wetlands where they would otherwise naturally build land and nourish the estuarine ecosystems. Deprived of the sediments provided by the deltaic processes, the estuarine wetlands continue to sink, or subside, as they have always done, but without the net land building effect of the unconstrained natural deltaic processes. Deprived of the natural sustenance provided by the nutrients available in the intermittently flooded zone in which they are adapted to live, the plants that define the surface of the coastal wetlands die off. Once the coastal wetlands are denuded, the fragile substrate is left exposed to - and unprotected from - the erosive tidal environment.

In 1990, passage of the Coastal Wetland Planning, Protection Restoration Act CWPPRA), provided authorization and funding for a multi-agency task force to begin actions to curtail wetland losses. In 1998, after extensive studies and construction of a number of coastal restoration projects accomplished under CWPPRA, the State of Louisiana and the Federal agencies charged with restoring and protecting the remainder of Louisiana's valuable coastal wetlands adopted a new coastal restoration plan in 1998. The underlying principles of the new plan, "Coast 2050: Toward a Sustainable Coastal

Louisiana," known as the Coast 2050 Plan, are to restore and/or mimic the natural processes that built and maintained coastal Louisiana. This necessitates basin-scale action to restore more natural hydrology and sediment introduction processes. The plan sub-divides Louisiana's coastal zone into four regions with nine hydrologic basins. The plan proposes ecosystem restoration strategies that would result in efforts larger in scale than any that have been implemented in the past.

The Coast 2050 Plan report served as the basis for the federal government to seek Water Resources Development Act (WRDA) approval of a comprehensive plan and authorization of major projects beyond what was being pursued under CWPPRA. In 2000, it was envisioned that a series of feasibility reports would be prepared over a 10-year period. The first feasibility efforts focused on the Barataria basin and involved Marsh Creation and Barrier Shoreline Restoration. However, early in fiscal year (FY) 2002, it was recognized that a more in-depth comprehensive study was needed that could be used early on to present to Congress a Comprehensive Plan that could be submitted to Congress for a "Programmatic Approval." As a result, the Louisiana Coastal Area (LCA) Comprehensive Coastwide Ecosystem Restoration Study was initiated. Subsequent to authorization, detailed studies would be completed on features of the Comprehensive Plan. As envisioned, these studies result in project implementation reports (PIR). PIRs would be in detail, sufficient to prepare plans and specifications to implement the proposed projects (Louisiana Coastal Area (LCA) Louisiana Comprehensive Coastwide Ecosystem Restoration Study Home Page. http://www.lca.gov/)

B. The Technical Summit - Learning from Others

The State of Louisiana is working to raise public awareness of the impact of Louisiana's wetland loss on the State, Nation, and world and is seeking to develop support for efforts to save coastal Louisiana. In August 2002, the State launched a three-year public education campaign, ***America's WETLAND***, designed to "… establish the values and significance of this vast world ecological region and…highlight the pending economic and energy security threat posed to our nation by its destruction."

As part of its efforts, ***America's WETLAND*** is sponsoring a series of seven 'summits' on various topics to bring together experts to discuss the State's and the federal government's plans for coastal restoration and the programs designed to manage the implementation of these plans and programs (http://www.americaswetland.com/index.cfm). Each summit is focused on identifying problem areas and recommending possible solutions. In August 2003, ***America's WETLAND*** sponsored its fourth Summit, Community & Culture to address threats to the culture of communities whose existence is threatened by wetland loss. In order to take advantage of the experience of scientists and engineers in carrying out restoration projects, ***America's WETLAND*** commissioned the American Society of Civil Engineers (ASCE) to convene the fifth Summit in New Orleans, Louisiana, on 16 and 17 October 2003. ASCE, in May 2003, had adopted Policy 498, Louisiana Coastal Restoration, to support the national and State efforts to deal with the coastal challenge.

C. Organization of the Summit

Organization

America's WETLAND asked ASCE to develop the agenda for and oversee the conduct of a technical summit that would bring together distinguished engineers and scientists with experience in restoration or similar activities to "create a record of current thinking on challenges presented by coastal land loss." ASCE appointed a select committee of experts representing three of its institutes - Coastal, Oceans, Ports, and Rivers Institute; Environmental and Water Resources Institute; and the Geotechnical Institute (Appendix A). The Committee members were selected for their broad technical and/or management experience related to restoration projects or other large, complex efforts requiring the melding of science and engineering most often at the interagency level. The committee was charged to develop the summit agenda, identify those who should participate, guide the conduct of the summit, and oversee the preparation of a report on the summit. Mr. James R. Hanchey, Assistant Secretary, Louisiana Department of Natural Resources, chaired the Committee.

Theme Areas

As indicated above, the purpose of the Summit was not to discuss specific restoration techniques but to foster discussion of key issues facing the scientific and engineering communities. The summit focused on the three theme areas: adaptive management, sustainable programs and sustainable development, and the marriage of engineering and science. Adaptive management was to include the concept of iterative planning. Sustainability would include the political, social, economic, technical, cultural, and environmental aspects of ensuring program viability over time, and the marriage of science and engineering would include discussion of ecological engineering as well as hydrology, geology, biology and chemistry.

Adaptive Management

Adaptive management has been defined as a structured process of "learning by doing" that involves much more than simply better ecological monitoring and response to unexpected management impacts…[it should] begin with a concerted effort to integrate existing interdisciplinary experience and scientific information into dynamic models that attempt to make predictions about the impacts of alternative policies."(Walters, C. 1997. Challenges in adaptive management of riparian and coastal ecosystems. *Conservation Ecology* [online]1(2):1 http://www.consecol.org/vol1/iss2/art1.) C.S. Holing, considered by many to be the father of adaptive management, and his colleagues at the University of Florida, indicate that, "Adaptive management seeks to aggressively use management intervention as a tool to strategically probe the functioning of an ecosystem. Interventions are designed to test key hypotheses about the functioning of the ecosystem. This approach is very different from a typical management approach of 'informed trialand-error' which uses the best available knowledge to generate a risk-averse, 'best guess' management strategy, which is then changed as new information modifies the 'best guess'. Adaptive management identifies uncertainties, and then establishes methodologies to test hypotheses concerning those uncertainties. It uses management as a tool not only to change the system, but as a tool to learn about the system. It is concerned with the need to learn and the cost of ignorance, while traditional management is focused on the need to preserve and the cost of knowledge…The achievement of these objectives requires an open management process which seeks to include past, present and future stakeholders. Adaptive management needs to at least maintain political openness, but usually it needs to create it. Consequently, adaptive management must be a social as well as scientific process. It must focus on the development of new institutions and institutional strategies just as much as it must focus upon scientific hypotheses and experimental frameworks." (http://nersp.nerdc.ufl.edu/~arm/research/adaptiveMngmt.html).

Adaptive management is in use today in the Everglades restoration, in management of the Columbia, Missouri, and Colorado Rivers and is being planned for use in the Upper Mississippi River ecological restoration program.

Sustainability

There are several meanings to 'sustainability.' Program sustainability deals with those actions that influence a program to fail or to continue. It implies that political, social, and economic actions can be taken to ensure the viability/continuation of a program over time. Resource sustainability implies that there are limits on the extent humans can use or modify a natural resource before significantly compromising the resource's value for future years or generations.

Program sustainability is a relatively new concept, tied most often to health program maintenance. In the context of restoration projects, it implies taking those actions necessary to ensure that a program, once started, will not be derailed by the absence of the resources need to continue it or because it comes to lack the political or social support of its goals and objectives.

The most widely used definition of resource sustainability was given in the context of sustainable development in 1987 when a United Nations Commission called for *a form of sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs*. Brian Richter, Director of the Sustainable Waters Initiative at the Nature Conservancy, indicates that "...managing for sustainability implies LIMITS to the degree to which humans can appropriate or modify a resource before compromising its value in future years or generations." Both approaches require careful analysis of the impacts of program actions on future use of the resources involved so that these resources will not be depleted or damaged to a point that they would not be available in the future.

The summit examined both types of sustainability although the majority of the discussion was focused on program sustainability.

Engineering and Science

Coast 2050: Toward a Sustainable Coastal Louisiana indicates that …"developments in restoration technology are required if the Coast 2050 Plan is to move forward…managing natural flows and directing sediment to areas of need means manipulating a major river system on an unprecedented scale. The engineering design of structures, channels and gates must advance to facilitate the control of the river's resources to meet the ecosystem needs…The effectiveness of [new] measures in different physical and ecological settings should be determined and the information disseminated to all involved in restoration work." Engineering and science in the 21st century will involve use of measures that represent a blend of structural and non-structural approaches. Opportunities to use natural processes as part of project development are growing. Bioengineering is already in use for slope stability, protection against traffic noise and pollution control. This marriage of engineering and science will require increased and continuous cooperation between engineers and scientists. Coastal restoration will deal not only with the coastal areas but will also require modifications to existing Mississippi River programs to accommodate such work as freshwater diversions.

Experience with restoration activities in other regions points out the need for engineering and science – both natural science and social science – to work together to solve the complex issues faced in restoration efforts.

Conduct of the Summit (Agenda: Appendix B)

On the morning October 15, summit attendees were given the opportunity to tour a restoration project south of New Orleans. During the opening session that afternoon, experts from within Louisiana reported on the history of the issues surrounding the loss of wetlands in Southern Louisiana and the ongoing challenges facing the State. Senior federal officials, including the Assistant Secretary of the Army (Civil Works), the Assistant Administrator for Water, US Environmental Protection Agency, and the US Army Chief of Engineers, provided a national perspective on wetland restoration and related federal programs. (List of Speakers: Appendix C)

The sessions on October 16 were moderated workshops with extensive attendee participation. In an initial plenary session experts briefed the attendees on five current restoration programs (the CALFED (San Francisco) Bay Area restoration project, the Everglades restoration in Southern Florida, the multi-state Chesapeake Bay restoration program and the restoration and maintenance programs in the Venice Lagoon, Italy and coastal maintenance of shore protection and coastal areas in the Netherlands. These programs are large in scope and involve significant public participation. Following the plenary session, attendees were asked to participate in breakout sessions reviewing the experiences of the just briefed restoration programs (Venice and the Netherlands were combined into one international session). During the breakout sessions, attendees addressed the applicability of lessons learned in the other programs to the work in Coastal Louisiana and developed agreement on experiences that might be transferred to the Louisiana program. The summit attendees reassembled for a final plenary session during which the results of the breakout sessions were used as a basis for identification of the most important findings within each of the three theme areas. The summit concluded with a conference summary.

Participants

The 94 Summit participants represented a broad array of disciplines and backgrounds and came from 13 states and two foreign countries. Attendees included representatives of five federal agencies, state and local government officials, the academic community, non-governmental organizations, consultants private businesses, and landowners.

D. The Case Studies and What They Represented

Each of the case studies presented in the Summit represented years of experience in dealing with political, engineering, and scientific challenges similar to those facing coastal Louisiana. Presenters focused on identifying lessons learned that might be transferable to the Louisiana environment.

CALFED

According to the State of California, "… the San Francisco Bay/Sacramento-San Joaquin Delta Estuary is the largest estuary on the West Coast of the United States. It includes over 738,000 acres in five counties. The tributaries, sloughs, and islands support over 750 plant and animal species… the bay-delta, its tributaries, and watershed are critical to California's economy, supplying drinking water for two-thirds of Californians and irrigation water for over 7,000,000 acres of the most highly productive agricultural land in the world. It also supports 80 percent of the State's commercial salmon fisheries…The bay-delta is the hub of California's two largest water distribution systems …It also provides the conveyance of floodwaters from most of the rivers in the Central Valley." (http://calwater.ca.gov/AboutCalfed/adobe_pdf/Booklet_DeltaAct.pdf)

The state is faced with conflicts over the use of the water, and the maintenance of its quality and the subsequent impact on the environment. The CALFED Bay-Delta Program was established "to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System." It represents an amalgam of more than 20 State and federal agencies working together with local communities to coordinate planning for and of implementation actions needed to "improve water supplies in California and the health of the San Francisco Bay-Sacramento/San Joaquin River Delta watershed." (http://calwater.ca.gov/AboutCalfed/AnnualReport2002/AnnualReport2002IntroductionOverview.pdf)

Everglades

According to those planning its restoration, the Everglades is an ecosystem in peril. Water systems have been disrupted and the region faces significant water quality challenges. "Once it was a vast, free-flowing river of grass extending from the Kissimmee chain of lakes to Florida Bay. Wading and migratory birds were so prolific they darkened the skies. Panthers, manatees and deer were abundant…in the 1800s, …primitive canals were dug to begin draining south Florida. These changes continued throughout the 20th century, as more than 1,700 miles of canals and levees vastly changed the landscape, interrupting the Everglades' natural sheetflow and sending valuable freshwater to sea. More than half the Everglades wetlands were lost to development [as the population in Southern Florida skyrocketed.] In 1948,[after a devastating flood, the US Congress authorized] a massive project to provide essential flood protection and water management to south Florida …While the Central and Southern Florida Project allowed the region's rapid growth, it worsened the Everglades' problems."

To respond to the situation, the federal government, in partnership with the State of Florida and local organizations has developed the Comprehensive Everglades Restoration Plan that spells out how the $7.8 billion 20 year Everglades restoration program will "capture freshwater destined for sea …and direct it back to the ecosystem to revitalize it [and]…improve water supplies for people and farms." (http://www.evergladesplan.org/about/why_restore.cfm).

Chesapeake Bay

The Chesapeake Bay Program Office reports that the Bay is "… the largest estuary in the United States and one of the most productive in the world, … this nation's first estuary targeted for restoration and protection. In the late 1970s, scientific and estuarine research on the Bay pinpointed three areas requiring immediate attention: nutrient over-enrichment, dwindling underwater Bay grasses and toxic pollution. Once the initial research was completed, the Bay Program evolved as the means to restore this exceptionally valuable resource. Since its inception in 1983, the Bay Program's highest priority has been the restoration of the Bay's living resources- its finfish, shellfish, Bay grasses, and other aquatic life and wildlife."

The program is a partnership led by a Chesapeake Bay Executive Council whose members are the governors of Maryland, Virginia, and Pennsylvania; the mayor of the District of Columbia; the administrator of the U.S. Environmental Protection Agency and the chair of the Chesapeake Bay Commission. In 2000, the partners signed a new agreement that will guide the next decade of restoration and protection efforts throughout the Bay watershed. The agreement commits to protecting and restoring living resources, vital habitats, and water quality of the Bay and its watershed. (http://www.chesapeakebay.net/overview.htm)

Venice and the Netherlands

The Netherlands

Water management has been a matter of survival in the Netherlands for over 750 years. The Dutch coast is made up of dunes, dikes, and water barriers that provide the low-lying areas of the country with a natural defense against the erosive forces of the North Sea and the English Channel. NetCoast reports that "Dunes are an important feature in the coastal landscape, extending along approximately three- quarters of the coastline and varying in width between less than 100 metres and several kilometers and are constantly moving under the influence of natural forces, advancing in one place and receding in another…Current Dutch policy with regard to coastal protection is to accept a certain amount of erosion in some areas and so far as possible to work with nature and accommodate it, rather than resist it by building engineering structures… It is considered prudent…to give nature a free hand in these areas and to do nothing so long as the islands continue to exist as a whole. In 1990, the Dutch government adopted a new coastal defence policy to the effect that the coastline would in future be held in the position it occupied in early 1990. This policy of dynamic preservation of the 1990 coastline means that dikes remain strong and in place, while maximum freedom is allowed for natural processes and considerable shoreline movement is tolerated in the beach flats …where there are no significant resources or assets."
(http://www.netcoast.nl/info/process/erosion_case.htm)

Venice

The Venice Lagoon has been used by humans for centuries for living, commercial fishing, hunting, transport and protection from enemies. To avoid filling up of the lagoon with river sediments, in medieval times the principal rivers flowing into the Lagoon were diverted from the Lagoon. The well-protected lagoon zone provided the site for a large port and industrial area, but created severe environmental problems. Modern habitat restoration measures for salt marshes and tidal mudflats of the Lagoon are now underway and another effort is being conducted to protect the lagoon from the high water from the Adriatic Sea. According to a panel of experts, "Venice is continuously exposed to the threat of high water. Over the last 300 years, the sea level in Venice has risen by about 50 centimeters relative to the land. The historic city is frequently flooded, which threatens the integrity of the buildings, causes inconvenience to the population, and is a disincentive for economic development. It is highly probable that relative sea level will continue to rise by an additional 10 to 20 centimeters over the next 50 years…"
(http://www.ramsar.org/mtg_venice_2003.htm)
(http://130.37.129.100/english/o_o/instituten/IVM/research/fb_venice.htm)

E. Findings of the Summit – Parsing the Case Studies

The considerable discussion among participants, first in breakout sessions and then in the facilitated plenary session, resulted in the identification of lessons learned and approaches used in other programs that merited consideration in moving ahead with Louisiana coastal restoration. These 'findings' are listed below and separated into items that cut across the entire program, those that fall into the three theme areas and their sub-themes, and comments on a technical issue that was surfaced by several participants.

General

1. The first step in restoration of the Louisiana coast must be the establishment of clear, broadly supportable, and publicly acceptable goals for the restoration program. These goals must recognize that the coast cannot be restored to some fixed previous state, that the task of restoring and maintaining the coast will be never ending, and that the plans for restoration must change over time.

2. In dealing with restoration activities, program leaders must recognize that they are dealing with natural forces whose actions cannot be completely predicted or controlled. Those formulating restoration plans need to recognize the difference between those mechanisms they can influence and those they cannot. The timing, magnitude, and consequences of natural events such as floods and hurricanes over long periods can be predicted, but in the short-term, they must be treated as random events and probability distributions where anything can happen.

3. Ecosystem restoration as a science is in its infancy. The larger the scale of the restoration, the less is known about how restoration efforts will work on the ecosystem as a whole. It is essential that those dealing with restoration projects appreciate the uncertainty involved in restoration. As work progresses, the uncertainties will be reduced but never eliminated. Promises of specific success represent opportunities to disappoint those who support restoration. Predictions must be guarded.

4. While there are still scientific unknowns concerning the ecosystem of the Louisiana coast and the Mississippi River, considerable data and information have been gathered over the last two centuries and are available for use. Complete knowledge of river and the coast will never be achieved. The amount of data and information that has been gathered is sufficient to proceed. Lack of information or data should not be used as a reason to delay work.

5. For restoration activities to be successful, the program must find leaders who are passionately committed to the task and prepared to remain engaged in the work for the long-term. These individuals must be responsible for maintaining program momentum.

6. While support may initially be strong for restoration, continuous effort must be placed on maintaining this support over time.

Adaptive Management

> *"The Committee does not expect rigid adherence to the Plan as it was submitted to Congress. This result would be inconsistent with the adaptive assessment principles in the [Everglades restoration]*

Plan…Instead the Committee expects that the agencies…. will seek continuous improvements of the Plan based on new information, improved modeling, new technology and changed circumstances." Senate Committee on Environment and Public Works July 27, 2000

7. As indicated in the above quote concerning the Everglades Restoration Project, it is expected that plans for complex ecological restoration programs will change as new information is gained. Adaptive management, as described in the earlier section, is widely recognized as the appropriate paradigm for the development and execution of such program and is being employed by federal and state agencies across the Nation. It provides for planning in the face of uncertainty, the situation found in coastal Louisiana.

8. Adaptive management, as a process, is new and not well understood by many who are responsible for its funding and its support. Both the public and government leaders need to be educated on the need for and the value of adaptive management and why the results obtained and the savings that result from use of adaptive management justify the costs of such programs.

9. To be successful, adaptive management requires the development of clear program goals and objectives. These goals and objectives provide direction for the establishment of 'experiments' that will test the effectiveness of program elements in achieving the desired goals and objectives.

10. The adaptive management program must not focus solely on experimentation and assessment but must produce tangible results in order to maintain stakeholder support. It is important to understand that some decisions will have to be based on incomplete, but best available science.

11. Adaptive management is founded on stakeholder involvement. Participation by a broad array of parties is critical to the success of the process. Adaptive management vests with stakeholders some decision-making (e.g. goal setting) and as a result can come into conflict with established roles and responsibilities of governmental agencies. It is critical that the program management structure clearly defines responsibilities for adaptive management so that, going in, participants understand their roles and responsibilities.

12. Adaptive management requires full acceptance of the process by all participating agencies and stakeholders. This will require education of participants about adaptive management. When there are changes in leadership, the new leaders must be prepared to move into an established and ongoing process and understand the problems that would occur were they to make arbitrary changes in the process.

13. Adaptive Management requires a significant investment in monitoring, data collection, and assessment. It is impossible to understand if progress is being

made without first understanding the baseline conditions and then monitoring these conditions to identify changes and trends.

14. Adaptive Management requires periodic evaluations of progress, revisions of objectives, reexamination of goals, and adjustment of targets to react to the results of the experiments that have been conducted. These changes should not be seen as flaws in the management process but rather as adjustments needed to retain focus on the goals and objectives. Evaluations must be scheduled on a regular basis so as not to confuse the public and decision makers with what could be perceived as ephemeral or subjective management decisions.

15. Monitoring, data collection, and assessment are expensive and must be carefully planned to avoid wasted effort in unnecessary collection of data. Monitoring, data collection, and assessment programs of participating groups should be complimentary not duplicative. While it will be impossible to monitor all conditions all the time, it is critical that some conditions be monitored continuously and the remainder on a defined rotational basis.

16. The program goals and objectives and the accompanying adaptive management programs should define the monitoring, data collection, and assessment programs.

Sustainability

17. Program sustainability requires continuous public support; however, because of the nature of the work, benefits are not quickly apparent, making it difficult to show the public success in the short term. This requires well-designed public involvement (education) programs to support the restoration process.

18. Program sustainability requires developing consensus on how to deal with the program elements. “Consensus takes time...but brings everyone to the same place”

19. The goals of programs should be agreed to by voluntary consensus of the stakeholders; however, all must recognize that this consensus is driven by an underlying foundation of regulatory programs, federal and state laws as well as local ordinances and codes which must either be observed or modified.

20. In some part, the political sustainability of the program rests on the ability to harmonize the different programs, timelines, and responsibilities of the local, state, and federal government.

21. Sustaining a natural resource does not necessarily result in preserving the present condition or returning to some previous condition. Resource sustainability must be carefully defined and all must understand and agree on the definitions. A sustainable status is not necessarily self-maintaining although some components may be self-maintaining.

22. The economic value of the goods and services associated with natural resources – their real market value – is generally underestimated and must, in the long run, be factored into the economics of coastal restoration.

23. A key to gaining public understanding of sustainability is continuous and evolving education. As restoration takes place, natural processes will be modified and the end state redefined. The public must understand this shifting end state.

Process.

24. Three key elements to a successful regional program are top-level political involvement, strong citizen support, and aggressive science-based goal setting.

25. In developing the process that is to be followed, it is important to define and publicize how decisions are going to be made and who is going to make them.

26. All must recognize that the goal of restoration is not a finishing point where all the work can be said to be complete; the goal must reflect the resource sustainability status sought and the implementation of actions necessary to maintain that status.

27. Goals provide program direction and a target for assessment of progress. Goals permit program leaders to display program progress to the public. Establishment of easily understood progress metrics is critical.

Public Involvement

28. The public involvement program must be non-partisan to enable long-term success. Any indications of sectoral or political bias will undermine the credibility of the program.

29. The public is more than those directly affected by coastal restoration. The public must include those who live in the area, those who live in the State, the basin, and, to a lesser degree, the Nation. The value of the program must be communicated to all of these publics. It is important to educate those living outside the project area so that they understand the political, environmental, and economic linkages between their hometowns and the Louisiana coast.

30. Public opinion will change during the life of a given project as results are seen and problems are identified. Adjustments to the program will have to be made to address these changing opinions.

31. In developing a public involvement program, program developers must have a clear understanding of the community knowledge base – what people know about

the problem - and understand the present level support for restoration. As public knowledge grows, the public involvement program will also change.

32. The public must be involved in the planning and assessment process from the beginning. This involvement must be continuous and must recognize that over time participants will change but the involvement should not. The door must always be open for the addition of 'new' people to the public involvement effort. The addition of new participants will require education programs to bring the new participants up to date on what has already occurred.

33. The program communications strategy must call for use of all available means to get the program message across, but must also recognize the realities of fiscal and legal limitations on such efforts. Existing communications mechanisms, such as those of the tourism industry and the programs of NGO's (including those beyond environmental and conservation groups, e.g. the League of Women Voters) can be used effectively to support the effort.

34. To be relevant over the long term, the public involvement process must be open, transparent, and inclusive. The process cannot be or be perceived to be a 'public relations' campaign. The operations of the program must be visible to the public. Key documents, including minutes of meetings, need to be available to the public on the web and in public facilities. Efforts must be made to ensure representation from all elements of the public including normally underrepresented groups.

35. To overcome difficulties in incorporating public concerns into project planning, it is important to:
    - Engage professional facilitators.
    - Involve local governments before or concurrent with conduct of public meetings.
    - Conclude meetings with clear identification of the level of consensus reached on the issues discussed.
    - Take a program approach rather than a project approach in public involvement in order to provide sufficient room to accommodate conflicting interests. Focusing on a small project makes it difficult to sort programmatic objections from site-specific issues.

Partners

36. The restoration of coastal Louisiana will require a partnership among the various levels of government, the private sector, and the public. Each has an important role that must be recognized and incorporated into the overall process. The federal partners include the Congress, the Administration, (the President, his office (OMB, CEQ) and the political appointees in the agencies) as well as federal agencies that must carry out elements of the program.

37. Non-federal partners must play strong and decisive roles, and program leaders must capitalize on use of their unique competencies. In dealing with the federal government and especially with the Corps of Engineers, they must be assertive and establish that the restoration program will require a different type of partnership than has been traditionally established for federal-state-local efforts.

38. The private sector must provide strong support for the program. While elements of the private sector will provide funding support for components of the program, the private sector must also play significant roles in other aspects of the program including the development of science, conduct of monitoring, data collection, and assessment, and participation in public involvement activities.

39. Program leaders must develop a thorough understanding of the process by which federal funds and programs are requested by the Administration and authorized and appropriated by the Congress. They must adapt their schedules to conform to the needs and requirements of the Administration and the Congress. They must reach agreement with the appropriate committees of the Congress on the level of specificity required in planning documents and the timing of the submissions required to support their authorization and appropriation processes.

40. In developing the funding strategy for the program, program leaders must examine alternative authorization and funding models. Because much of the work during the later stages of the program will be dependent on the results of the initial phases of work, it will be difficult to accurately define a fixed authorization and funding stream. The experience of funding the Everglades indicates that a model that is based on contingent actions (i.e. later actions are dependent on the result of the earlier actions) may be more appropriate than a linear –fixed funding stream - model.

41. Program leaders must seek and obtain the support of other states in the Mississippi Basin for the restoration program. Since many of the problems associated with the coast have resulted from actions taken in other parts of the basin, it is imperative that this is communicated to the leaders in other states and that they provide political support in Washington for the program. They must understand that they have a stake and a role in the program.

42. Coastal restoration will involve some investment of public monies for work on private lands and such action may elicit negative pubic reaction. Program leaders must be prepared to address the rationale for each use of public monies for such work.

Program and Project Review

43. Periodic independent reviews of project and program elements have been an essential component of successful restoration efforts in other regions. The lack of

such reviews has hampered progress on some projects and has ultimately resulted in project delays to ‘go back’ and review the work.

44. Reviews must be independent, rigorous, and transparent. Reviewers must come from in and out of the state and from elements of agencies not directly involved in the program to avoid any inference that the review reflects a narrow perspective or is politically driven. In some limited and sensitive cases, it may be useful to include anonymous reviewers.

45. The scope of any review must be carefully and clearly defined and focused on program needs. Failure to be specific may lead to reviews that deal only with generalities and do not provide adequate information to support program change decisions. It may be useful to conduct tiers of independent review based on issues and projects rather than just conducting broad program level reviews.

Engineering and Science

46. Program success will require the full support of both engineers and scientists.

47. Participation from the scientific community must include both natural and social scientists. The challenges faced in dealing with coastal restoration will require the talents of economists, political scientists, geographers, biologists, ecologists, and a number of other disciplines. No one discipline has a corner on the knowledge required.

48. Over time engineers and scientists will become familiar with aspects of the program beyond their fields of study and responsibility and their views on these topics should not be disregarded but should be considered along with those of other stakeholders.

49. By nature of agency make-up and responsibilities, to many people, engineers appear to be in the center of the work and scientists appear to be outside. Engineers and scientists need to be equal team partners in the development of the program, working together from the beginning and focused on accomplishing the mission. Scientists engaged in the process must see their roles to be as team participants, not critics, and this must be reflected in how they are treated by the engineers and program managers. The work of engineers and scientists must be collaborative and multi-disciplinary. Multi-agency collaboration (as opposed to coordination) must be considered an integral part of the process. Engineers and scientists need to work together to develop concepts and methods that are satisfactory for both groups.

50. Engineers and scientists have different attitudes and approaches to problem identification and problem solving. The same situation also occurs within science and within engineering. It is important that as work begins, provisions are made to bring the disciplines together for cross-education in the critical topics being

addressed. The groups must gain respect for each other's paradigms, approaches, and culture. The program leaders must develop methods to ensure a constructive interaction among disciplines that fosters innovation and the retention of objectivity.

51. Even when a specific project appears to be entirely focused on engineering, e.g. levee construction, it is important to bring other disciplines into consultation. Most programs that have been successful have followed this approach.

52. The European experience would indicate that while there is room for considerable innovation during the initial planning of restoration projects and consideration of all alternatives, when implementation begins, innovation is often pushed aside by need to cope with economic restrictions and the chosen approach is often the cheapest, non-innovative one. Program leaders must fight to retain innovative approaches and ensure their inclusion in program planning.

53. It is a challenge to keep scientists, who are not working on the program on a day-to-day basis, fully engaged over the long term. In many cases, their expertise is only needed on an intermittent basis and it is easy for them to move away from work on restoration issues. Program leaders need to develop incentives to ensure their continuous participation.

54. There must be funding for continuous research to support the restoration program. Efforts must be made to encourage innovative –out of the box – research. The research community must have sufficient flexibility to adjust research programs to address issues and gaps as they arise.

Technical Comments

55. Several individuals were concerned about the challenge of finding and using adequate sediment to carry out restoration activities. They raised the following questions, all of which must eventually be addressed:
    - Is there enough sediment in the river?
    - What other options exist for sediment supply other than taking it from river flow- dredged material?
    - What has caused sediment reduction in river?
    - How do you go about restoring more than one delta lobe?
    - How do you take into account the fact that the current delta has extended beyond the pattern of earlier deltas by reaching the continental shelf with sediment being deposited in deep water?

F. Drawing Conclusions and Recommendations

This report was prepared to describe the conduct of the Technical Summit and to identify key points raised during the Summit. As a next step, the ASCE Task Committee on ***America's WETLAND***, based on their participation in the Summit and their review of this report, will develop conclusions and recommendations and identify next steps to be taken by the State of Louisiana in dealing with the Coastal Restoration Program.

APPENDICES

A - Organizing Committee

B – Summit Agenda

C- Speakers

Appendix A

Task Committee on America's WETLAND
American Society of Civil Engineers

James R. Hanchey, PE, Chair
Assistant Secretary, Louisiana Department of Natural Resources

Steven R. Abt, PhD, PE, Member
Professor of Civil Engineering and Executive Associate Dean, Colorado State University

Gordon P. Boutwell, Jr., PhD, PE, Member
President, Soil Testing Engineers, Baton Rouge, Louisiana

Charles C. Calhoun, Jr., PE, Member
Consultant, Vicksburg, MS

Henry J. Hatch, PE, Member
Consultant, Washington, DC

Donald F. Hayes, PhD, PE, Member
Associate Professor of Civil Engineering, University of Utah

Ehab A. Meselhe, PhD, PE, Member
Associate Professor at the Civil Engineering Department of the University of Louisiana, Lafayette

John E. Durrant, PE, Advisor
Managing Director of Engineering Programs, American Society of Civil Engineers

Dominic Izzo, PE, Advisor
Vice President, Marine Engineering Business Line, U.S. Gulf Coast, DMJM+HARRIS, Houston, TX

Gerald E, Galloway, Jr. PE, PhD, **Consultant**
Vice President, Enterprise Engineering Group, ES3 Sector, Titan Corporation

Jerome Delli Priscoli, PhD, Consultant
Senior Policy Analyst, US Army Institute for Water Resources, Ft. Belvoir, VA

Appendix B

America's WETLAND

Summit Series-Technical

October 16-17, 2003

Hotel Monaco - New Orleans

Organized by:

American Society of Civil Engineers *Thursday, October 16, 2003*

1:00 PM **America's WETLAND INTRODUCTORY VIDEO**

1:10 PM **INTRODUCTION**

.

James R. Hanchey, Assistant Secretary, Louisiana Department of Natural Resources

1:15 PM **WELCOMING ADDRESS**

Andy Kopplin, Chief of Staff for Governor M. J. "Mike" Foster, Jr.

1:30 PM **OPENING SESSION**

.

The Honorable G. Tracy Mehan, Assistant Administrator for Water, U.S. Environmental Protection Agency

The Honorable John Paul Woodley, Assistant Secretary ofthe Army (Civil Works)

Lieutenant General Robert B. Flowers, Chief of Engineers, U.S. Army Corps of Engineers

2:30 PM **BREAK** -

2:45 PM **EXPLANATION OF PROCEDURES AND GOALS OF WORKSHOPS**

Gerald E. Galloway, P.E., Vice President, Enterprise Engineering Group, Enterprise Services and Solutions Sector, Titan Corporation

Jerome Delli Priscoli, Institute for Water Resources

3:00 PM GENERAL SESSION

"The Challenge"

James Coleman, Professor, Louisiana State University

Robert Twilley, Director, Center for Ecology and Environmental Technology, and Professor, Department of Biology, University of Louisiana, Lafayette

Ted Falgout, Executive Director, Greater Lafourche Port Commission

"Responding to the Challenge"

Berwick Duval, Attorney at Law, Member, Governor's Advisory Commission on Coastal Restoration and Conservation

Bill Good, Administrator, Coastal Restoration Division, Louisiana Department of Natural Resources

Jon Porthouse, Planning Section Manager, "Coastal Restoration Division, Louisiana Department of Natural Resources

5:00 PM RECEPTION

Cobalt Restaurant, Hotel Monaco

Friday, October 17, 2003

8:00 AM America's WETLAND "DON'T BE A BIG LOSER" VIDEO

8:10 ***AM WELCOME***

Thomas L. Jackson, P.E., F. ASCE
President, American Society of Civil Engineers
Vice President and Chief Engineer, DMJM-Harris

8:20 AM CASE STUDY BRIEFINGS

California Bay-Delta
Dan Ray, Environmental Scientist, Ecosystem Restoration Program, California Bay-Delta Authority

Chesapeake Bay
Carin Bisland, Associate Director for Ecosystem Management, Chesapeake Bay Program Office

Florida Everglades
Stuart J. Appelbaum, Chief, RECOVER Branch, U.S. Army Corps of Engineers, Jacksonville District

Venice and The Netherlands
Charles McClennen, Professor, Colgate University

Huib de Vriend, Professor of Integrated Modeling at the University of Twente, Netherlands

9:30 AM WORKSHOP PROCEDURES & THEMES
Gerald E. Galloway, PE, Vice President, Enterprise Engineering Group, Enterprise Services and Solutions Sector, Titan Corporation

9:45 AM BREAK

10:00 AM WORKSHOP SESSION I

California Bay-Delta - *Sydney Boardroom*

Chesapeake Bay - *Athens Boardroom* Florida Everglades - *Tokyo Boardroom* Venice and The Netherlands - *Paris Ballroom*

12:00 PM LUNCH

1:00 PM WORKSHOP SESSION II

California Bay-Delta - *Sydney Boardroom*

Chesapeake Bay - *Athens Boardroom* Florida Everglades - *Tokyo Boardroom* Venice and The Netherlands - *Paris Ballroom*

2:45 PM BREAK

3:00 PM WORKSHOP GENERAL SESSION
Breakout Reports and Workshop Conclusions

4:55 PM CLOSING REMARKS

James R. Hanchey, Assistant Secretary, Louisiana Department of Natural Resources

Appendix C

Speakers
America's WETLAND Technical Summit

Stuart J. Appelbaum
Chief, RECOVER Branch, U.S. Army Corps of Engineers, Jacksonville District

Carin Bisland
Associate Director for Ecosystem Management, Chesapeake Bay Program Office

Dr. James Coleman
Professor, Louisiana State University

Berwick Duval
Attorney at Law, Member, Governor's Advisory Commission on Coastal Restoration and Conservation

Ted Falgout
Executive Director, Greater Lafourche Port Commission

Lieutenant General Robert B. Flowers
Chief of Engineers, U.S. Army Corps of Engineers

Dr. Gerald E. Galloway
Vice President, Enterprise Engineering Group, ES3 Sector Titan Corporation

Bill Good
Administrator, Coastal Restoration Division, Louisiana Department of Natural Resources

James R. Hanchey
Assistant Secretary, Louisiana Department of Natural Resources

Lauren L. Hastings
Delta Regional Coordinator, Ecosystem Restoration Program, California Bay-Delta Authority

Thomas L. Jackson
President, American Society of Civil Engineers
Vice President and Chief Engineer, DMJM-Harris

Andy Kopplin
Chief of Staff for Louisiana Governor M. J. "Mike" Foster, Jr.

Dr. Charles McClennen
Professor, Colgate University

Honorable G. Tracy Mehan
Assistant Administrator for Water, U.S. Environmental Protection Agency

Jon Porthouse
Planning Section Manager, "Coastal Restoration Division, Louisiana Department of Natural Resources

Dr. Jerome Delli Priscoli
US Army Institute for Water Resources

Dan Ray
Environmental Scientist, Ecosystem Restoration Program, California Bay-Delta Authority

Robert Twilley
Director, Center for Ecology and Environmental Technology, and Professor, Department of Biology, University of Louisiana, Lafayette

Honorable John Paul Woodley
Assistant Secretary of the Army (Civil Works)

Dr. Huib de Vriend
Professor of Integrated Modeling, University of Twente, Netherlands